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Tatsuya Hayashi

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EXAMINER

WAITS, ALAN B

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/590,910	Applicant(s) HAYASHI ET AL.	
	Examiner ALAN B. WAITS	Art Unit 3656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,6-8,10,13 and 14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,6-8,10,13 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Hayashi WO2004038240 (US 2006/0098907 used as English equivalent).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

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Hayashi discloses a similar device comprising:

Re clm 1

- A fixed-side member (7c, fig 1)
- A rotational-side member (2b, fig 1)
- A thrust bearing surface (P, fig 2) formed on one of the fixed-side member and the rotational-side member
- The thrust bearing surface including a dynamic pressure generating groove area having a plurality of dynamic pressure generating grooves (P2, fig 2) being arranged thereon
- A depth of each groove in the plurality of dynamic pressure generating grooves being constant (fig 3)
- A thrust receiving surface (bottom of 2b, fig 1) provided on the other one of the fixed-side member and the rotational-side member so as to be opposed to the thrust bearing surface in an axial direction
- A thrust bearing gap (space between 2b and 7c) formed between the thrust bearing surface and the thrust receiving surface
- a reduced portion (P, fig 3) having an axial width decreasing in a radially outward direction is disposed in the thrust bearing gap
- the reduced portion being formed by an inclined plane (H1, fig 3) disposed at the thrust bearing surface
- the plurality of dynamic pressure generating grooves is disposed on the inclined plane

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- a pumping power of the dynamic pressure generating grooves is maximized in a radially outermost portion of the reduced portion
- the thrust bearing gap has a uniform portion (7c1, fig 3) with a constant width formed on an inner diameter side of the reduced portion

3. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi US2001/0022870.

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Takahashi discloses a similar device comprising:

Re clm 1

- A fixed-side member (2, fig 5)
- A rotational-side member (1, fig 5)
- A thrust bearing surface (1a, fig 5) formed on one of the fixed-side member and the rotational-side member
- The thrust bearing surface including a dynamic pressure generating groove area having a plurality of dynamic pressure generating grooves (11, fig 5) being arranged thereon
- A depth of each groove in the plurality of dynamic pressure generating grooves being constant (fig 5)
- A thrust receiving surface (2a, fig 5) provided on the other one of the fixed-side member and the rotational-side member so as to be opposed to the thrust bearing surface in an axial direction
- A thrust bearing gap (3, fig 5) formed between the thrust bearing surface and the thrust receiving surface
- a reduced portion (inclined surface of 1a, fig 5) having an axial width decreasing in a radially outward direction is disposed in the thrust bearing gap
- the reduced portion being formed by an inclined plane (inclined surface of 1a, fig 5) disposed at the thrust bearing surface

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- the plurality of dynamic pressure generating grooves is disposed on the inclined plane
- a pumping power of the dynamic pressure generating grooves is maximized in a radially outermost portion of the reduced portion
- the thrust bearing gap has a uniform portion (section of 1 between the inner most groove and 1P, fig 5) with a constant width formed on an inner diameter side of the reduced portion

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3, 7, 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi US2001/0022870 in view of Nakagawa US 2002/0172438 and in further view of Takanobu JP 02-278007.

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Takahashi discloses a similar device comprising:

Re clm 3

- A shaft member (10, fig 6) having a shaft portion (10s, fig 6) and a flange portion (10f, fig 6)
- The flange portion having an end face (surface facing 20, fig 6)
- A thrust bearing portion (20, fig 6) having an end face
- The end face of the thrust bearing portion being opposed to the end face of the flange portion so as to support the shaft member in an axial direction in a non-contact manner by the pressure
- At least a part of the end face of the flange portion facing the thrust bearing gap is formed as an inclined plane (fig 6)

Takahashi does not disclose:

- The end face of the flange portion facing the thrust bearing gap is formed of a resin
- The shaft member includes an outer shaft portion forming an outer peripheral face of the shaft portion and an inner shaft portion disposed on an inner periphery of the outer shaft portion
- The outer shaft portion is formed of a metal
- The inner shaft portion and the flange portion are integrally formed of a resin
- An axial resin of the inner shaft portion being thicker than the flange portion on an outer diameter side of the flange portion

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Nakagawa teaches a similar bearing tube arrangement comprising:

- The end face of the flange portion (portion of 62 that sticks out past the inner diameter of tube 61, fig 1) facing the thrust bearing gap is formed of a resin (62, fig 1)
- The shaft member includes an outer shaft portion (61, fig 1) forming an outer peripheral face of the shaft portion and an inner shaft portion (62, fig 1) disposed on an inner periphery of the outer shaft portion
- The outer shaft portion is formed of a metal
- The inner shaft portion and the flange portion are integrally formed of a resin (fig 1)
- An axial resin of the inner shaft portion (portion of 62 inside the inner diameter of 61, fig 1) being thicker than the flange portion on an outer diameter side of the flange portion

Since both Takahashi and Nakagawa teaches a shaft and flange system for a bearing assembly, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute:

- The end face of the flange portion facing the thrust bearing gap is formed of a resin
- The shaft member includes an outer shaft portion forming an outer peripheral face of the shaft portion and an inner shaft portion disposed on an inner periphery of the outer shaft portion
- The outer shaft portion is formed of a metal

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- The inner shaft portion and the flange portion are integrally formed of a resin
- An axial resin of the inner shaft portion being thicker than the flange portion on an outer diameter side of the flange portion

for the attachment and composition of the shaft and flange system of Takahashi to achieve the predictable result of reducing the weight of the device.

Takahashi further does not disclose:

- The inclined plane being inclined so as to approach the opposed end face of the thrust bearing portion in a radially outward direction

Takanobu teaches both concave (fig 4) and convex (fig 1) bearing surfaces.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Takahashi and provide:

- The inclined plane being inclined so as to approach the opposed end face of the thrust bearing portion in a radially outward direction

since Takanobu teaches both concave (like fig 6 of Takahashi) and convex surfaces to improve a fluid bearing's life span.

Re claim 7, Takahashi does not disclose:

- A ratio is set such that $h/r \leq 0.01$ where a length of the inclined plane in a radial direction is r and a height of the inclined plane is h

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Takahashi and provide:

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- A ratio is set such that $h/r \leq 0.01$ where a length of the inclined plane in a radial direction is r and a height of the inclined plane is h

since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Re clm 10 and 14, Nakagawa further discloses:

- A rotor magnet (21, fig 1) attached to the rotational-side member
- A stator coil (31, fig 1) attached to the fixed-side member

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi US 2001/0022870 as applied to claim 1 above.

Takahashi discloses all the claimed subject matter as described above.

Re clm 6, Takahashi does not disclose:

- A ratio is set such that $h/r \leq 0.01$ where a length of the inclined plane in a radial direction is r and a height of the inclined plane is h

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Takahashi and provide:

- A ratio is set such that $h/r \leq 0.01$ where a length of the inclined plane in a radial direction is r and a height of the inclined plane is h

since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

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7. Claims 8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over anticipated as applied to claim 1 above, and further in view of Nakagawa US 2002/0172438.

Re clm 8 and 13

Takahashi discloses all the claimed subject matter as described above.

Takahashi does not disclose:

- A rotor magnet attached to the rotational-side member
- A stator coil attached to the fixed side member

Nakagawa teaches a similar bearing device comprising:

- A rotor magnet (21, fig 1) attached to the rotational-side member
- A stator coil (31, fig 1) attached to the fixed side member

Since both Takahashi and Nakagawa teach a bearing device, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the bearing mechanism of Takahashi into the motor bearing of Nakagawa to achieve the predictable result of providing thrust support in the bearing.

Response to Arguments

8. Applicant's arguments with respect to claims 1, 3, 6-8, 10, 13 and 14 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues "Nakagawa fails to disclose an axial thickness of the resin of the inner shaft portion being thicker than the flange portion on the outer diameter side of the flange portion." The examiner disagrees. Nakagawa clearly shows an axial thickness of the resin of the inner shaft portion (portion of 62 inside the inner diameter of

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tube 61, fig 1) being axially thicker than the flange portion (portion of 62 that abuts the end of the tube wall of 61 between the inside diameter and outside diameter of 61, fig 1).

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALAN B. WAITS whose telephone number is (571)270-3664. The examiner can normally be reached on Monday through Friday 7:30 am to 5 pm EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on 571-272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alan B Waits/
Examiner, Art Unit 3656

/Richard WL Ridley/
Supervisory Patent Examiner, Art Unit 3656